SEMESTER END EXAMINATION, APRIL-MAY, 2025

Course Name: - B. Tech **Semester: - VI**

Paper Name: - Compiler Design **Paper Code: - TCS-602**

Time - 3 Hrs + 20 minutes per hour extra time for V.I. & examinees with writer. **Max Marks-70**

Additional 30 Minutes for Mid-Test.

Instructions:

- The question paper consists of three sections namely A, B, C. All sections are compulsory.
- Section A- Each question carries 3 marks. All questions are compulsory.
- Section B- Answer any 5 out of 7 given questions. Each question carries 7 marks.
- Section C- Answer any 2 out of 3 given questions. Each question carries 10 marks.
- Section D- Each question carries **02 mark**. All questions are compulsory

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Section – A (खण्ड–अ)

Objective Questions(वस्तुनिष्ठ प्रश्न)

1. Answer all the following questions. **5×3 =15**

i) Which data structure is used by compiler for managing variables and their attributes

a) Binary tree
b) Parse tree
c) Symbol table
d) Cross compiler

ii) Which of the following is a top-down Parser

a) Recursive descent parser
b) Predictive parser
c) LR(k)
d) LALR(K)

iii) Which of the following is not the output of LEX tool

a) Lex.yy.c
b) a.out
c) lex.yy.l
d) none of these

iv) Consider the grammar S → (S) | a

Let the number of states in SLR(1), LR(1) and LALR(1) parsers for the grammar be n1, n2 and n3 respectively. The following relationship holds good

a) n1<n2<n3
b) n1=n3<n2
c) n1=n2=n3
d) n1=n2<n3

v) Which of the following is not a representation of three-address code

a) goto L
b) pram x1
c) x= y op z
d) x=op y

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Section – B (खण्ड–ब)

Short Answer Questions (लघुउत्तरीय प्रश्न)

2. Answer any five of the following. **5×7=35**

i. What are the different phases of compiler? Write down the output of each phase for the expression **a=b+ c/50**

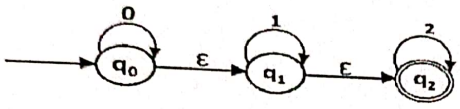
ii. Write the quadruple and triple representation of expression a+ b ×c/e ↑ f +b× c

iii. Discuss the various data structures used for symbol table with example.

iv. What is cross compiler? How is bootstrapping of a compiler done to a second machine?

v. What is syntax directed translation? How are semantic actions added to the production? explain with example

vi. Convert the following NFA to DFA



vii. Calculate LR (1) items for the following grammar

S→CC

C→ c C /p

Section – C (खण्ड–स)

Descriptive Questions (विवरणात्मक प्रश्न)

3. Answer any two of the following question. **2×10=20**

i) Define predictive parser. consider the following grammar and construct predictive parsing table after removing left recursion.

E→E+T/ T

T→T*F / F

F⟶F */ a /b

ii) **(a)** Write short notes on a) Loop optimization b) basic block

(b) What do you understand by lexical phase error and syntactic error? Also suggest methods for recovery of errors.

iii) Write an algorithm to find FIRST and FOLLOW of a variable. Apply the algorithm to find FIRST and FOLLOW of each variable in the following grammar

S → ACB / CbB / Ba

A → da / BC

B → g / ∈

C → h / ∈

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Mid-Test

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Time - 30 minutes. | **Max Marks-20**

All questions are compulsory. **2×10=20**

सभी प्रश्न अनिवार्य हैं।

Q1 A ..... combines object files into an executable file, while..... puts the executable file into memory.

a) Linker, loader
b) Loader, linker
c) Linker, linker
d) Loader, loader

Q2 A CFG is ambiguous if

a) it has more than one left most derivation
b) it has more than one right most derivation
c)no parse tree is generated
d) both a and b

Q3Which of the following symbol table implementation has the minimum access time?

a) Self-organizing list
b) Linear
c) Search tree
d) Hash table

Q4 The process of searching for matched tokens is typically described using .....

a)Finite automata
b)Regular expression
c)CFG
d)both a and b

Q5.....is considered as a sequence of characters in a token.

a)Pattern
b)lexeme
c)LEX
d)Token

Q6Left factoring is the process of factoring out the common

a) Prefixes of alternates
b) Suffixes of alternates
c) Both(a) and (b)
d) None of these

Q7An intermediate code form is _____

a) Postfix notation
b) Syntax Trees
c) Three Address code
d) All of the mentioned

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Q8A synthesized attribute is an attribute whose value at a parse tree node depends on _____

a) Attributes at the siblings only
b) Attributes at parent node only
c) Attributes at children nodes only
d) None of the mentioned

Q9 Assembler is a program that _____

a) Puts programs into memory and executes them
b) Translates the assembly language into machine language
c) translates high level language into assembly language
d) None of the mentioned

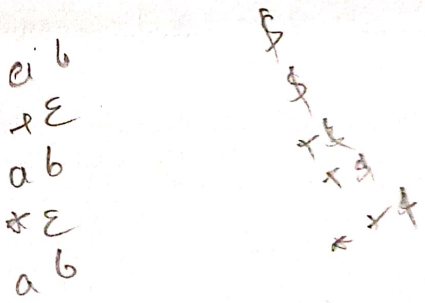
Q10 Consider the grammar

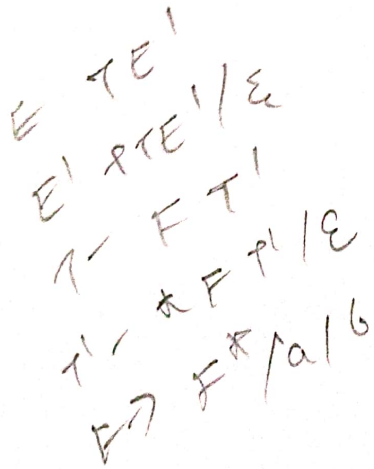
S→tABCD
A→qt/t
B→r/ε
C→q/ε
D→p

What is FOLLOW{A}?

a){r, q, p, t}
b){r, q, p}
c){ε,.r, q, p}
d) { q, t}

.....





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